Mathematics: Standard 1 Number Sense and Computation

K	1st	2nd	3rd
K 1.1 Count objects in a set and use objects, pictures, and numerals to represent whole numbers to 20. **K.1.2** Find the number that is one more than or one less than any whole number up to 20. **K.1.3** Use correctly the words one/many, none/some/all, more/less, and most/least, equal to/more than/less than. **K.1.4** Show equivalent forms of whole numbers from 10 to 20 as groups of tens and ones. **K.1.5** Model addition by joining sets of objects (for any two sets with fewer than 10 objects when joined) and model subtraction by removing objects from sets for numbers less than 10 **K.1.6** Record and organize information and answer questions about data using objects and pictures in context.	**1.1.1** Count, read, write, order, rename and compare whole numbers to at least 100. **1.1.2** Name the number that is one more than or one less than any number to at least 100. **1.1.3** Match the ordinal numbers first, second, third, etc. with an ordered set to at least 10 items. **1.1.4** Show equivalent forms of whole numbers to at least 100 as groups of tens and ones. **1.1.5** Solve problems involving addition and subtraction by modeling addition of numbers to at least 100 (putting together, increasing) and modeling the inverse operation of subtraction (taking away, comparing, finding the difference) using objects. **1.1.6** Demonstrate fluency with addition facts and the corresponding subtraction facts for totals to at least 20. **1.1.7** Pose a question, then collect and represent data using pictures or picture graphs to answer the question posed.	**2.1.1** Count, read, write, compare, and plot on a number line whole numbers to at least 1000. **2.1.2** Count by ones, twos, fives, tens, and hundreds to at least 1000, and show the number that is ten more or ten less than any number 10 through 90. **2.1.3** Match the ordinal numbers, first, second, third, etc. with an ordered set of at least 100 items. **2.1.4** Use words models, standard form and expanded form to show equivalent forms of whole numbers up to at least 1,000 as groups of hundreds, tens and ones. **2.1.5** Identify numbers as even or odd by placing that number of objects in two groups of the same size and recognizing that for even numbers no object will be left over and for odd numbers one object will be left over. **2.1.6** Solve problems involving addition and subtraction of whole numbers less than 1000 fluently uisng a standard algorithmic approach and show the inverse relationship between addition and subtraction. **2.1.7** Compare data displayed in tables and picture graphs within the table or graph and with data on other tables and graphs to address a single question.	**3.1.1** Count, read, write, compare, and plot on a number line whole numbers up to at least 10,000. **3.1.2** Interpret and model fractions as parts of a whole, parts of a group, and points and distances on a number line for numbers less than, equal to, or greater than one. **3.1.3** Compare and order fractions by using models, benchmark fractions, or common numerators or denominators. **3.1.4** Use words, models, standard form and expanded form to represent place value of whole numbers up to at least 10,000. **3.1.5** Solve problems involving addition and subtraction of whole numbers fluently using a standard algorithmic approach. **3.1.6** Represent the concept of multiplication of whole numbers with models as repeated addition, equal-sized groups, arrays, area models, and equal "jumps" on a number line. Explain the result of multiplying by zero. **3.1.7** Represent the concept of division of whole numbers with models as successive subtraction, partitioning and sharing, and an inverse of multiplication. Show that division by zero is not possible. **3.1.8** Construct and analyze frequency tables and bar graphs from data, including data collected through observations, surveys, and experiments. **3.1.9** Identify events on a continuum from impossible to unlikely, equally likely, likely or certain. Determine a simple probability in a context using pictures.

Mathematics: Standard 1 Number Sense and Computation

4th	5th	6th	7th	8th
4.1.1 Count, read, write, compare, and plot whole numbers using words, models, number lines and expanded form. **4.1.2** Find equivalent fractions and then use them to compare and order whole numbers and fractions using the symbols for less than (<), equals (=), and greater than (>). **4.1.3** Solve problems involving decimals to hundredths. Interpret and model decimals as parts of a whole, parts of a group, and points and distances on a number line. Use benchmarks (well-known numbers used in meaningful points for comparison) to compare decimals between 0 and 1.0. Write decimals as fractions. **4.1.4** Use words, models, standard form and expanded form to represent place value of decimal numbers to hundredths. **4.1.5** Demonstrate fluency with multiplication facts for numbers up to at least 10 an the related division facts and identify factors of whole numbers. Identify multiplies of whole numbers to 10. **4.1.6** Solve problems using multiplication of two-digit by two-digit numbers fluently using a standard algorithmic approach. **4.1.7** Model addition and subtraction of simple fractions. **4.1.8** Construct and analyze line plots. Given a set of data or a graph, describe the distribution of the data using median, range or mode. **4.1.9** List all the possible outcomes of a given situation or event.	**5.1.1** Count, read, write, compare, and plot on a number line decimals to thousandths using words, models and expanded form. **5.1.2** Compare and order fractions and decimals to thousandths by using the symbols for less than (<), equal to (=), and greater than (>). **5.1.3** Identify and explain prime and composite numbers. **5.1.4** Use words, models, standard form and expanded form to represent place value of decimal numbers to thousandths. **5.1.5** Solve problems involving multiplication and division of whole numbers fluently using a standard algorithmic approach and explain how to treat the remainders in division. **5.1.6** Solve problems involving addition and subtraction of decimals including money, fractions, (including fractions with different denominators) and mixed numbers using a standard algorithmic approach. **5.1.7** Solve problems involving the multiplication of fractions using a standard algorithmic approach. Explain the relationship of the product relative to the factors. **5.1.8** Construct and analyze line graphs and double bar graphs from data, including data collected through observations, surveys, and experiments. **5.1.9** Perform simple experiments gathering data from a large number of trials and distinguish between certain and likely outcomes.	**6.1.1** Compare, order, and represent on a number line positive and negative integers, fractions, decimals (to hundredths), and mixed numbers. **6.1.2** Interpret the absolute value of a number as the distance from zero on a number line, find the absolute value of real numbers and know that the distance between two numbers on the number line is the absolute value of their difference. **6.1.3** Use percents to represent parts of a whole and find the percentage part of a whole. **6.1.4** Recognize commonly used fractions, decimals, and percents and their equivalents and convert between any two representations of any non-negative rational numbers without the use of a calculator. **6.1.5** Solve problems involving addition, subtraction, multiplication and division of integers and represent computation with integers on a number line. Describe the effect of operations with numbers less than zero. **6.1.6** Solve problems involving addition, subtraction, multiplication and division of positive fractions and decimals and explain why a particular operation was used for a given situation. **6.1.7** Interpret ratios, model ratios, and use ratios to show the relative sizes of two quantities. Use the notations: a/b, a to b, and a:b, write equivalent ratios, express a ratio in its simplest form, and find the ratio of two given quantities. **6.1.8** Recognize proportional relationships and solve problems involving proportional relationships. Find the missing term in a pair of equivalent ratios and find one quantity given the other quantity and their ratio **6.1.9** Solve simple percent, ratio and proportion problems, including problems involving discounts at sales, interest earned, and tips.	**7.1.1** Read, write, compare and solve problems using whole numbers in scientific notation. **7.1.2** Recognize and compute whole number powers of positive integers. **7.1.3** Recognize the prime factors of a number and find the prime factorization of whole numbers and write the results using exponents. **7.1.4** Recognize or use prime and composite numbers to solve problems. **7.1.5** Recognize and use the inverse relationship between squaring and finding the square root of a perfect square integer. **7.1.6** Identify, write, rename, compare and order rational and common irrational numbers and plot them on a number line. **7.1.7** Solve problems that involve multiplication and division with integers, fractions, decimals and combinations of the four operations. **7.1.8** Solve problems involving percents.Find the whole given a part and the percentage; and find percentage increase or decrease. **7.1.9** Solve problems involving ratios and proportions. Express one quantity as a fraction of another, given their ratio, and vice versa; find how many times one quantity is as large as another, given their ratio, and vice versa; express one quantity as a fraction of another given the two quantities; find the whole, or one part, when a whole is divided into parts in a given ration; and solve problems involving two pairs of equivalent ratios.	**8.1.1** Interpret calculator or computer displays of numbers given in scientific notation and read, write, compare and solve problems using decimals in scientific notation. **8.1.2** Recognize positive integer powers as repeated multiplication and negative integer powers as repeated division or multiplication by the multiplicative inverse. **8.1.3** Use the laws of exponents for integer exponents and evaluate expressions with negative integer exponents. **8.1.4** Identify, compare and order irrational numbers . **8.1.5** Calculate square roots of perfect squares, estimate square roots of numbers less than 1,000, and use the inverse relationship between squares and square roots. **8.1.6** Solve percent, ratio and proportion problems (find average rates; express one quantity as a percentage of another; compare two quantities by percentage; use percentages greater than 100%; increase or decrease a quantity by a given percentage; find the original amount for a given percentage increase or decrease; solve problems involving percents, ratios and proportions; and solve problems involving simple and compound interest).

Mathematics: Standard 2 Algebra and Functions

K	1st	2nd	3rd
K.2.1 Verbally describe mathematical relationships involving addition and subtraction situations for numbers less than 10. **K.2.2** Create, extend, and give the rule for simple patterns with numbers and shapes.	**1.2.1** Write and solve equations involving addition. **1.2.2** Create, extend and give a rule for number patterns using addition. **1.2.3** Solve problems using the identity principle for addition and subtraction.	**2.2.1** Write equations to solve single and multi-step addition and subtraction word problems. **2.2.2** Create, extend and give a rule for number patterns using addition and subtraction. **2.2.3** Show that that the order in which numbers are added (commutative property) and how the numbers are grouped in addition (associative property) will not change the sum. These properties can be used together to show that numbers can be added in any order.	**3.2.1** Write and solve equations using (=) to show equivalence and use variables to express mathematical relationships involving multiplication. **3.2.2** Create, extend and give a rule for number patterns using multiplication. **3.2.3** Solve problems using the identity principle of multiplication.

4th		5th	
4.2.1 Write and solve equations with (=) to show equivalence and use with variables to express mathematical relationships involving multiplication and division. **4.2.2** Create, extend and give a rule for number patterns using multiplication and division and non-numeric growing or repeating patterns. **4.2.3** Show that the order in which numbers are multiplied (the commutative property) and how the numbers are grouped in multiplication (associative property) will not change the product. Use these properties together to show that numbers can be multiplied in any order. **4.2.4** Use the distributive property in expressions involving multiplication .		**5.2.1** Write and evaluate simple algebraic expressions. **5.2.2** Use two-dimensional coordinate grids to represent points in the first quadrant that fit linear equations and draw the line determined by the points.	

Mathematics: Standard 2 Algebra and Functions

6th	7th	8th
6.2.1 Write and solve one-step linear equations and inequalities in one variable. **6.2.2** Write and use formulas with up to three variables to solve problems. **6.2.3** Apply the correct order of operations and the properties of real numbers identity, inverse, commutative, associative and distributive properties to evaluate numerical expressions, including those that use grouping symbols such as parentheses. Justify each step in the process. **6.2.4** Identify and graph ordered pairs in all four quadrants of the coordinate plane. **6.2.5** Solve problems involving linear functions with integer values. Create a table; graph the resulting ordered pairs of integers on a grid. Look for patterns in how a change in one variable relates to a change in the second variable and write the equation.	**7.2.1** Use variables and appropriate operations to write an expression, equation or inequality that represents a verbal description. **7.2.2** Write and solve two-step linear equations and inequalities in one variable. **7.2.3** Evaluate numerical expressions and simplify algebraic expressions involving rational and irrational numbers. **7.2.4** Solve an equation or formula with two variables for a particular variable. **7.2.5** Find the slope of a line from its graph and relate the slope of a line to similar triangles. **7.2.6** Draw the graph of a line given its slope and one point on the line or two points on the line. **7.2.7** Identify situations that involve proportional relationships, draw graphs representing these situations and recognize that these situations are described by a linear function in the form $y = mx$ where the unit rate m is the slope of the line.	**8.2.1** Write and solve linear equations and inequalities, interpret the solution or solutions in their context, and verify the reasonableness of the results. **8.2.2** Solve equations and formulas for a specified variable. **8.2.3** Simplify algebraic expressions involving powers. **8.2.4** Identify and graph linear functions and identify lines with positive and negative slope. **8.2.5** Find the slope of a linear function given the equation and write the equation of a line given the slope and any point on the line. **8.2.6** Translate among tables, equations, verbal expressions and graphs of linear functions and recognize that in ($y = mx + b$) that m is the rate of change and b is the vertical intercept of the graph. **8.2.7** Identify functions as linear or nonlinear and contrast their characteristics from tables, graphs and equations. **8.2.8** Use linear functions and linear equations to represent, analyze and solve problems.

Mathematics: Standard 3 Geometry and Measurement

K	1st	2nd	3rd	4th
K.3.1 Identify, describe, sort, compare, and classify objects by shape, size, number of vertices, and other attributes. **K.3.2** Identify the positions of objects in space and use the terms inside, outside, between, above, below, near, far, under, over, up, down, behind, in front of, next to, to the left or right of. **K.3.3** Make direct comparisons of length and weight of objects and recognize which object is shorter, longer, taller, lighter or heavier. **K.3.4** Identify concepts of time (before/after, shorter/longer, morning, afternoon, evening, today, yesterday, tomorrow, week, month, and year).	**1.3.1** Identify, describe, compare, sort and draw triangles, rectangles, squares, and circles by their attributes (position, shape, size, and number of vertices). Use simple plane shapes to compose a given shape. **1.3.2** Estimate and measure the length of an object to the nearest inch and centimeter. **1.3.3** Give the value of a collection of pennies, nickels, and dimes up to $1.00.	**2.3.1** Recognize, identify and describe attributes of common shapes and solids (e.g., the size and type of shape, the two-dimensional faces of three-dimensional figures, the number of sides, edges and vertices and location in space). **2.3.2** Identify and draw congruent two-dimensional shapes in any position. Describe and compare properties of simple and compound figures composed of triangles, rectangles, and squares. **2.3.3** Measure length in standard units (inch, foot, yard) and metric units (centimeter and meter) and select appropriate units to estimate and measure lengths. Use the relationships between the units to express answers in different units. Use units of linear measurements and relationships within a particular system to solve problems. **2.3.4** Describe relationships of time (seconds in a minute, minutes in an hour, hours in a day, days in week, and days in a year) and tell time on an analog clock to five minute intervals. **2.3.5** Find the value of a collection of pennies, nickels, dimes, quarters and dollars.	**3.3.1** Identify angles that are right angles and other angles that are greater than or less than a right angle. **3.3.2** Identify, describe and draw points, lines and line segments and use these terms when describing two-dimensional shapes. **3.3.3** Identify and draw lines of symmetry in geometric shapes and recognize symmetrical shapes in the environment. **3.3.4** Find the perimeter of polygons. **3.3.5** Choose and use appropriate units and tools to estimate and measure length and weight. Estimate and measure length to 1/4 inch, weight in pounds and kilograms, and temperature in Celsius and Fahrenheit selecting appropriate units for the given situation.	**4.3.1** Identify, describe and draw pairs of parallel lines, perpendicular lines, and nonperpendicular intersecting lines using appropriate mathematical tools and technology. **4.3.2** Identify, describe and draw right angles, acute angles, obtuse angles, straight angles and rays using appropriate tools and technology. **4.3.3** Identify shapes that have reflectional and rotational symmetry. **4.3.4** Measure and draw line segments to the nearest eighth-inch, and millimeter. **4.3.5** Develop and use formulas for finding the perimeter and area of rectangles, including squares, using appropriate strategies (e.g. decomposing shapes), tools and units of measure.

Mathematics: Standard 3 Geometry and Measurement

5th	6th	7th	8th
5.3.1 Measure angles and describe angles in degrees. **5.3.2** Identify, classify and draw polygons and triangles (equilateral, isosceles, scalene, right, acute, and obtuse triangles). **5.3.3** Describe the attributes (such as number of edges, vertices, and number of faces) of solids, including cubes, pyramids and cylinders. **5.3.4** Identify and describe using words and pictures, transformations such as reflections, rotations, and translations and use this knowledge to design and analyze simple tilings and tessellations. **5.3.5** Develop and use the formulas for the perimeter and area of triangles, parallelograms and trapezoids using appropriate units for answers. Find the area of complex shapes by dividing them into basic shapes. **5.3.6** Develop and use the formulas for the surface area and volume of rectangular prisms using appropriate units for measures.	**6.3.1** Identify, draw, and use the properties of vertical, adjacent, complementary, and supplementary angles to solve problems involving an unknown angle. **6.3.2** Recognize that the sum of the interior angles of any triangle is 180º and that the sum of the interior angles of any quadrilateral is 360º. Use this information to solve problems. **6.3.3** Develop and use the formulas for the circumference and area of a circle. **6.3.4** Recognize that real-world measuremetns are approximations; identify appropriate instruments and units for a given measuremnt situation, taking tinto acount the precision of the measurement desired. **6.3.5** Develop and use the formulas for the surface area and volume of a cylinder and find the surface area and volume of three-dimensional objects built from rectangular solids and cylinders.	**7.3.1** Identify and use basic properties of angles formed by transversals intersecting pairs of parallel lines. **7.3.2** Identify, describe, and use transformations (translations, rotations, reflections and simple compositions of these transformations) to solve problems. **7.3.3** Draw two-dimensional patterns (nets) for three-dimensional objects, such as right prisms, pyramids, cylinders and cones. **7.3.4** Recognize, describe, or extend geometric patterns using tables, graphs, words, or symbols. **7.3.5** Identify, describe, and construct similarity relationships and solve problems involving similarity and scale drawings by using proportional reasoning. **7.3.6** Solve simple problems involving distance, speed and time (understand concepts of speed and average speed; understand the relationship between distance, time and speed; find speed, distance or time given the other two quantities; write speed in different units (km/h, m/s, cm/s, mi/hr, ft/sec); and solve simple problems involving speed and average speed).	**8.3.1** Perform basic compass and straight edge constructions: angle and segment bisectors, copies of segments and angles, and perpendicular segments. Describe and justify the constructions. **8.3.2** Identify, define, or describe properties of three-dimensional geometric objects and describe how two or more figures intersect in a plane or in space, and visualize or describe the cross section of a solid. **8.3.3** Explain why the Pythagorean Theorem is valid using a variety of methods and use the Pythagorean Theorem and its converse to calculate lengths of line segments. **8.3.4** Solve simple problems involving rates and other derived measurements, including problems involving speed, uniform speed, average speed and density, by applying the concept of proportionality to measurement in different contexts. Express measurements in a given unit or in terms of other units of the same type. **8.3.5** Use scale factors to find the area, and volume of similar figures. **8.3.6** Find and use the surface aea and volume of cones, spheres and pyramids. **8.3.7** Estimate and compute the area of irregular two-dimensional shapes and the volume of irregular three-dimensional objects by breaking them down into more basic geometric objects. **8.3.8** Solve problems involving conversions within the same measurement system and estimate the measure of an object in one system given the measure of that object in another system and the approximate conversion factor .

Mathematics: Standard 4 Data Analysis and Probability

6th	7th	8th
6.4.1 Construct and analyze circle graphs and stem-and-leaf-plots. **6.4.2** Choose the appropriate display for a single variable set of data from bar graphs, line graphs, circle graphs, and stem-and-leaf plots. Justify the choice of data display. **6.4.3** Compare the mean, median and mode for a set of data and explain which measure is most appropriate in a given context. **6.4.4** Solve problems involving probability as a measure of chance and verify that the probabilities computed are reasonable. **6.4.5** Recognize and represent probabilities as ratios, measures of relative frequency, decimals between 0 and 1, and percentages between 0 and 100.	**7.4.1** Create, analyze and interpret data sets in multiple ways using bar graphs, frequency tables, line plots, histograms and circle graphs. Justify the choice of data display. **7.4.2** Make predictions from statistical data and use proportions to make estimates about a population based on a sample . **7.4.3** Describe how additional data, particularly outliers, added to a data set may affect the mean, median and mode. **7.4.4** Analyze data displays, including ways that they can be misleading. Analyze ways in which the wording of questions can influence survey results. **7.4.5** Understand that when all outcomes of an experiment are equally likely, the theoretical probability of an event is the fraction of outcomes in which the event occurs.	**8.4.1** Identify claims based on statistical data and, in simple cases, evaluate the reasonableness of the claims. Design a study to investigate the claim. **8.4.2** Identify different methods of selecting samples; analyze the strengths and weaknesses of each method, and the possible bias in a sample or display. **8.4.3** Use mean, median, mode, upper and lower quartiles and range to compare data sets. Organize and display data to highlight important features such as the range and how the data is pread around a central value. Investigate effects of change in data values on the measures of central tendency of the set of data. **8.4.4** Analyze, interpret and display data in box-and-whisker plots. **8.4.5** Display two-variable data in scatter plots and describe how the data points are distributed. If the pattern appears to be linear, draw a line that appears to best fit the data and write the equation of that line. **8.4.6** Describe and apply the addition rule for probabilities for simple events that are mutually exclusive and for simple events that are not. **8.4.7** Compute probabilities of events from simple experiments with equally probable outcomes, using such methods as organized list, tree diagrams and area models.